7.1 OVERVIEW

This Section summarizes the recommended overall strategy for deploying the Miami Valley ITS and presents estimates of the implementation, operating and maintenance and staffing costs associated with deployment through the first five years of the ITS program.

7.2 REGIONAL DEPLOYMENT CONCEPT

Deployment of the individual systems of the recommended Miami Valley ITS should generally follow the process shown in Figure 7-l and described below.

1. ITS Deployment Vision

   Each deployment opportunity should be reviewed for compatibility with the regional deployment vision. The region should not pursue or support a project that does not allow for linkage with other ITS deployments in the region.

2. System Champion (Agency & Political)

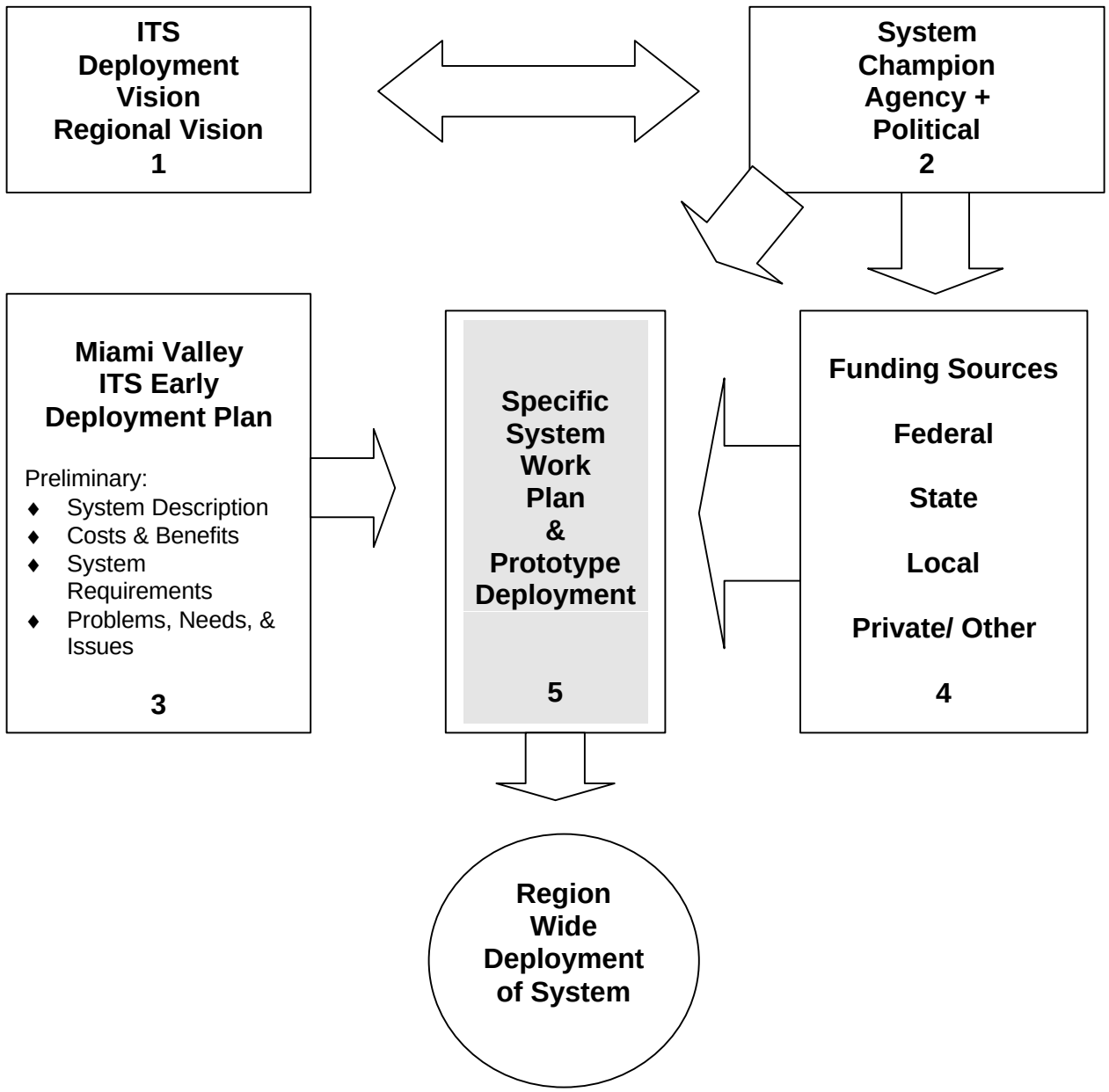
   A champion is an individual that strongly supports the deployment of a specific system or series of systems and is willing to exert the effort and influence necessary to follow through from the early deployment design to project funding and actual deployment. A champion is critical and should be sought for each system or project. The champion should encompass political influence, as well as sponsor agency connections and responsibilities. Multiple champions may be necessary, and champions may come from various agencies.

3. Miami Valley ITS Strategic Plan

   The Strategic Plan in its entirety represents a "tool box" and framework for ITS deployment. The Plan is built upon consensus among the various agencies and transportation interests within the region. It contains the concerns, considerations, and insight of transportation professionals in the Miami Valley. It provides for consistency with other regions in terms of system architecture and data exchange. It should be the policy of the region to reference pertinent sections of the Strategic Plan prior to proceeding with funding application, design, or construction processes.

Figure 7-1

Individual ITS System
Deployment Process Suggestion



4. Funding Sources

Typically, funding, is the most common barrier to ITS deployment. Funding is competitively obtained from federal, State, private, and other resources. The system champions should provide the necessary impetus to aggressively pursue funding. MVRPC, as the MPO and Regional Transportation Planning Agency, should support champions pursuing funds for appropriate ITS projects. Regional and local funds are a critical component of funding ITS projects can be used to leverage additional federal and state funds. The Strategic Plan acts as a framework for pursuing funds by defining systems, projects, issues, and costs.

5. Specific System Work Plan and Prototype Deployment

As the deployment of an individual system proceeds, it will be necessary to outline a work plan specific to each deployment. This work plan should reflect the funding resources being pursued, funding already acquired, relationship with the regional goals of the Strategic Plan, and the deployment needs of involved parties. The work plan should also detail deployment of a prototype system and establish evaluation criteria to be reviewed once the prototype has been deployed.

6. Region-wide Deployment of System

The prototype should provide a clear path for regional deployment that meets the needs of the region in addition to the sponsoring party or agencies. Deployment of ITS should reflect the region's interests and needs. Deployments should be pursued with consideration for regional impacts and potential.

7.3 COSTS

Implementation, operating and maintenance and staffing costs were estimated for the first five years of the recommended regional ITS deployment. The cost estimates are conceptual and will be revised as individual projects are developed.

For costing purposes, the conservative assumption was made that the public sector will fund the entire cost of the ITS deployment. This assumption allows the entire cost of the ITS deployment to be identified, without regard to who will fund which portions of it. However, the recommended ITS program includes a number of specific projects and mechanisms intended to insure private sector partnership and cost sharing and partnerships should be pursued vigorously. Program Area 5 identifies several specific areas where partnership potential exists and includes specific efforts to promote public-private partnerships.

7.3.1 Costing Assumptions

Tables 7.1 through 7.3 present the major assumptions used to develop estimated costs for the first five years of the Miami Valley ITS deployment program.

TABLE 7.1
FREEWAY/INCIDENT MANAGEMENT SYSTEM COSTING ASSUMPTIONS

Components, Units and Unit Costs

Comuonent	Cost per Unit	Typical Units Per Centerline Mile	Notes
Freeway Service Patrol Vehicle	$75,000	.10 - .07	Typical coverage is 10-l 5 miles/vehicle Two drivers per vehicle (working two shifts) Fully equipped vehicle, including communications/electronics
Vehicle Detection (Intrusive, e.g. loops)	$10,000	4	
CCTV Camera	$50,000	1	
Enhanced Reference Marker	$50	10	Assumes simple, mile marker type at .2 mile spacing in each direction
CMS	$120,000	1	
Portable Traffic Management Unit	$100,000	N/A	"Smart Work Zone Unit" featuring portable CMS and detection

Non-Labor Operating & Maintenance Costs = 5 percent of capital cost

Design/Study Costs = 10 percent of capital cost

Assumed Freeway Management System Mileage (all Four Counties)

Roadway	Miles	Notes
I-75	44	
I-70	53	
I-675	26.2	
us 35	10.3	Gettysburg to SR 835
SR4	5.5	From I-75 to SR 444
Total	139	

Assumed Deployment Segment Mileage

Roadway & Segment	Miles
I-75 - US 40 to I-675	19
I-75 - US 35 to I-70	8.5
I-75 - US 35 to I-675	9
I-70SR48toSR201	9

Source: BRW, Inc., July 1997

TABLE 7.2
ADVANCED TRAFFIC SIGNAL CONTROL SYSTEM COSTING ASSUMPTIONS

Components, Units and Unit Costs

Component	Unit	Cost per Unit	Number of Units by Year of Implementation						Notes
			Year1	Year2	Year3	Year4	Year5	Total	
Signal Timing Plan Update	Signal	$2,000	220	220	220	220	219	1,099	Includes data collection, development of timing plan and implementation Assumes a total of 1,099 signals in the Miami Valley (per Table 6. I in Program Area 2). Assumes that the 1,099 signals will be updated over a period of five years with an equal number of signals updated each year.
Microprocessor Controller Unit	Signal	$10.000	23	23	23	23	22	114	Includes controller and cabinent. Half of the 227 signals (see Table 7.2) will be updated in Years l-5, with an equal number of updates each year.
Coordinated Signal System Improvements (Ph. I & II)	Signal	$25,000	7	8	14	14	15	58	Cost will vary significantly by location ond specific improvments made. Assumes a total of 58 signals in Phase I & ll (Years I-S) projects (see Table 7.3).
Highway/Railroad Intersection Study	Study	575,000	1					1	A single study will address locations throughout Clark County The study will include specific recommendations for specific locations.
Highway/Railroad Intersection Improvements	Crossing	5 100,000		1	1	1	1	4	Cost will vary significantly by location and specific improvments made. This figure represents a budget amount rather than a cost estimate.
Emergency Vehicle Preemption Study	Study	$125,000			1			1	A single study will address locations throughout the Miami Valley The study will include specific recommendations for specific locations.
Freeway Traffic Diversion Timing Plan	Corridor	$125,000		1					Study develops and implements timing plans at all signals along designated parallel arterial streets along a segment of a major freeway corridor, e.g., I-75 from US 35 to I-70).
Special Event Timing Plan	Location	$50,000	2	2				4	Includes development and implementation

Estimated Number of Non-Microprocessor Controlled Traffic Signals

Jurisdiction	Number of Non-Microprocessor Controlled Signals
Springfield	49
Greene County	7
Xenia	28
Tipp City	4
Brookville	2
Dayton	125
New Lebanon	1
Oakwood	2
ODOT District 7	4
Riverside	1
Trotwood	2
Vandalia	1
West Carrollton	
Total	227

Source: BRW, Inc.; September 1997

TABLE 7.3
PHASE I AND II (YEARS 1-5)
COORDINATED TRAFFIC SIGNAL SYSTEM IMPROVEMENTS

County	Phase	Roadway	Segment (1)	Number of Signals
Clark	Phase II	SR 72 (south to north)	Sehna Road to Eagle City Road	12
Greene	Phase I	SR 444 (west to east)	SR 844 to end of divided highway	3
	Phase II	SR 444 (west to east)	Start of undivided highway to I-675	5
		US 35 (west to east)	North Fairfield Road to Valley Road	4
Montgomery	Phase I	SR 202 (south to north)	Huber Heights South Corporate Limits to Chambersburg Road	4
		SR 201 (south to north)	Kitridge Road/Huber Heights South Corporate Limits to Chambersburg Road	4
		Woodman Drive/Harshman Road (south to north)	SR 4 to SR 201	2
	Phase II	SR 202 (south to north)	Chambersburg Road to Miami Co. Line	7
		SR 201 (south to north)	Chambersburg Road to Miami Co. Line	6
		Woodman Drive/Harshman Road (south to north)	Linden Avenue to SR 4	6
		SR 48 (south to north)	I-70 to divergence from US 40	5
TOTAL				58

(1) All locations are approximate.

Source: BRW, Inc., July 1997

7.3.2 Implementation Costs

Implementation costs include all costs associated with development and implementation of projects with the exception of agency staff costs, which are reflected in the staffing requirements shown in Table 7.6. Table 7.4 presents an estimate of the conceptual implementation costs of the first five years of the recommended Miami Valley ITS deployment. Implementation costs have been broken down into the components of "Study/Design", "Construction" and "Other Operating and Maintenance (O &M)"

Table 7.4 presents costs for each project and project phase in the six program areas. Table 7.5 summarizes costs by project phase and Table 7.5.1 summarizes costs by program area.

7.3.3 Staffing Requirements

Table 7.6 presents the estimated public agency staffing requirements associated with the first five years of the recommended Miami Valley ITS deployment. As noted in Table 7.6, all non-agency labor costs, e.g., consultants, are reflected as direct implementation expenses in Table 7.4

7.4 SCHEDULE

Table 7.7 summarizes the recommended phasing of the ITS program by program area, project and project phase. The deployment timeline has been divided into the four primary stages used throughout the development of projects and reflected in the phasing tables at the beginning of each program area: Intermediate Term (Years 1-2), Short Term (Years 3-5, Mid-Term (Years 6-l0) and Long Term (Years 1 l-20).

The schedule shown in Table 7.7 reflects the interdependencies between elements of the recommended ITS and a fairly aggressive implementation schedule based upon existing transportation needs and the potential for significant ITS benefits. It should be noted, however, that the programming of specific projects must be coordinated with existing programming cycles, including Ohio Department of Transportation and MVRPC schedules (TIP, STIP, Ohio Project Development Management System, etc.).

Table 7.8 summarizes deployment milestones by year and program area for the first five years of the recommended ITS deployment.

7.5 FUNDING SOURCES AND TRENDS

Regional deployment of ITS technologies is a complex and often expensive undertaking. Funding is often a critical obstacle to ITS deployment. The project Policy and Technical Committees frequently noted that funding was a top concern, with operations and maintenance funding being especially critical. Many agencies may be in a position to deploy a system but may lack the ability to fund its full operation and maintenance costs once outside funding sources drop away. When

TABLE 7.4

Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.0 FREEWAY/INCIDENT MANAGEMENT PROJECTS						
1.1 Detection/Verification						
I I. I Service Patrols						
Study or Design:	$25.000	$0	$0	$0	$0	$25.00(
Construction:	$75,000	$75,000	$75.000	$75.000	$75.000	$375,000
Other O & M:	$15,000	$30,000	$45,000	$60,000	$75.000	$225,000
1.1.1 Subtotal	$I 15,000	$105,000	$120.000	$ I35.000	$ I50,000	$625,00(
I. I .2 Phase I Detection System						
Study or Design:	*$110,000*	*$0*	*$0*	*$0*	*$0*	*$110,000*
Construction:	$	0 $1,120,000	$1,120,000	$1,120.000	$1.120.000	$4,480,000
Other O & M.	$0	$0	$56,000	$I 12,000	$ I68.000	$336,00(
1.1.2 Subtotal	*$ I 10,000*	$1,120,000	$1,176,000	$1.232,000	$1,288,000	$4,926,000
1.1.3 Phase II Detection System						
Study or Design						
Constructuon:		**No Activity Scheduled for Years 1 - 5**				
Other O & M:						
1.1.3 Subtotal						
I. I .4 Regional Cellular Hotline Incident Reporting System						
Study or Design	$0	$0	$50,000	$0	$0	$50,000
Construction:	$0	$0	$0	$170,000	$140,000	$310,000
Other O & M:	$0	$0	$0	$5,000	$12,000	$17,000
1.1.4 Subtotal	$0	$0	$50,000	$175,000	$152,000	$377,000
1.1.5 Phase I CCTV Camera System						
Study or Design:	$85,000	$0	$0	$0	$0	$85,000
Construction:	$0	$210,000	$210,000	$210,000	$210,000	$840,000
Other 0 & M:	$0	$0	$10,500	$20,100	$30,600	$61,200
1.1.5 Subtotal	$85,000	$210,000	$220,500	$230. I00	$240,600	$986,200
1.1.6 Phase 11 CCTV Camera System						
Study or Design:	$0	$0	$195,000	$0	$0	$195,000
Construction:	$0	$0	$0	$240,000	$240,000	$480,000
Other 0 & M:	$0	$0	$0	$0	$12,000	$12,000
1.5.6 Subtotal	$0	$0	$195,000	$240,000	$252,000	$687,000
1. I .7 Phase 111 CCTV Camera System						
Study or Design:						
Construction		**No Activity Scheduled for Years 1 - 5**				
Other 0 & M:						
1.1.7 Subtotal						
I. I .8 Phase I Enhanced Reference Markers						
Study or Design:	$1.400	$0	$0	$0	$0	$1,400
construction:	$7,000	$7,000	$0	$0	$0	$14,000
Other 0 & **M:**	$0	$400	$800	$800	$800	$2,800
1.1.8 Subtotal	$8,400	$7,400	$800	$800	$800	$18,200
1.1.9 Phase II Enhanced Reference Markers						
Study or Design:						
Construction:		**No Activity Scheduled for Years 1 - 5**				
Other 0 & M:						
1.1.9 Subtotal						
Project 1.1 Total	$318,400	$1,442,400	$1,762,300	$2,012,900	$2,083,400	$7,619,40(

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4

Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.0 FREEWAY/INCIDENT MANAGEMENT PROJECTS						
1.2 Traveler Information						
I .2.1 Phase I Freeway CMS						
Study or Design:	$96,000	$0	$0	$0	$0	$96.000
Construction:	$0	$240,000	$240,000	$240,000	$240,000	$960,000
Other 0 & M:	$0	$0	$12,000	$24,000	$36.000	$72,000
1.2. I Subtotal	$96,000	$240,000	$252,000	$264,000	$276,000	$ I,128,000
1.2.2 Phase II Freeway CMS						
Study or Design:	$0	$0	$100,000	$0	$0	$100.000
Construction:	$0	$0	$0	$360,000	$360,000	$720,000
Other 0 & M:	$0	$0	$0	$0	$18,000	$18,000
1.2.2 Subtotal	$0	$0	$100,000	$360,000	$378.000	$838,000
1.2.3 Phase III Freeway CMS						
Study or Design:		**No Activity Scheduled for Years 1 - 5**				
Construction:						
Other 0 & M:						
1.2.3 Subtotal						
1.2.4 Highwny Advisory Radio						
Study or Design:	**$0**	**$0**	**$0**	**$85,000**	**$0**	**$85,000**
Construction:	**$0**	**$0**	**$0**	**$0**	**$1,700,000**	**$1,700,000**
Other 0 & M:	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
1.2.4 Subtotal	**$0**	**$0**	**$0**	**$85,000**	**$1,700,000**	**$1,785,000**
1.2.5 Major Generator/Local ATIS Study						
Study or Design	**$150,000**	**$0**	**$0**	**$0**	**$0**	**$150,000**
Construction:	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Other 0 & M:	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
1.2.5 Subtotal	**$150,000**	**$0**	**$0**	**$0**	**$0**	**$150,000**
1.2.6 Major Generator/Local ATIS Implementation						
Study or Design:	**$0**	**$500,000**	**$0**	**$450,000**	**$0**	**$950,000**
construction:	**$0**	**$0**	**$450,000**	**$0**	**$400,000**	**$850,000**
Other 0 & M:	**$0**	**$0**	**$50,000**	**50,000**	**$100,000**	**$200,000**
1.2.6 Subtotal	**$0**	**$500,000**	**$500,000**	**$500,000**	**$500,000**	**$2,000,000**
Project 1.2 Total	$246,000	$740,000	$852,000	$1,209,000	$2,854,000	$5,901,000

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4
Miami Valley ITS - Conceptual Implementation Cost

Program Area/Project		Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.0 FREEWAY/INCIDENT MANAGEMENT PROJECTS							
1.3 Traffic Control							
1.3.1 Ramp Meter Study							
Study or Design:		$0	$100,000	$0	$0	$0	$100,000
Construction:		$0	$0	$0	$0	$0	$0
Other O & M		$0	$0	$0	$0	$0	$0
	1.3.1 Subtotal	$0	$100,000	$0	$0	$0	$100,000
1.3.2 Ramp Meter Implementation							
Study or Design:		No Activity Scheduled for Years 1 - 5					
Construction:							
Other O & M:							
	1.3.2 Subtotal						
	Project 1.3 Total	$0	$100,000	$0	$0	$0	$100,000
1.4 Enhanced Incident Management Program							
1.4.1 Portable Traffic Management System							
Study or Design:		$10,000	$0	$0	$0	$0	$10,000
Construction:		$200,000	$0	$0	$0	$0	$200,000
Other O & ML		$0	$10,000	$10,000	$10,000	$10,000	$40,000
	1.4.1 Subtotal	$210,000	$10,000	$10,000	$10,000	$10,000	$250,000
1.4.2 Incident Management Task Force and Memorandum of Understanding							
Study or Design:		**Included in 1.4.3**					
Construction:							
Other O & ML							
	1.4.2 Subtotal						
1.4.3 Regional Incident Management Program Plan		$100,000	$0	$0	$0	$0	$100,000
Study or Design		$0	$0	$0	$0	$0	$0
Construction:		$0	$0	$0	$0	$0	$0
Other O & M:	*1.4.3 Subtotal*	$100,000	$0	$0	$0	$0	$100,000
1.4.4 I-75 Incident Management Operational Plan		$0	$150,000	$0	$0	$0	$150,000
Study or Design		$0	$0	$0	$0	$0	$0
Construction:		$0	$0	$0	$0	$0	$0
Other O & M:	*1.4.4 Subtotal*	$0	$0	$0	$0	$0	$150,000
1.4.5 I-75 Incident Management System							
Study or Design:		$0	$0	$0	$0	$0	$0
Construction:		$0	$500,000	$0	$0	$0	$500,000
Other O & M:	*1.4.5 Subtotal*	$0	$0	$50,000	$50,000	$50,000	$150,000
		$0	$500,000	$50,000	$50,000	$50,000	$650,000
1.4.6 Regional Incident Management System							
Study or Design:							
Construction:			$25,000	$25,000	$25,000	$25,000	$100,000
Other O & M:				$2,500	$5,000	$7,000	$15,000
	1.4.6 Subtotal	$0	$25,000	$27,000	$30,000	$32,500	$115,000
	Project 1.4 Total	$310,000	$685,000	$87,500	$90,000	$92,500	$1,465,000

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4
Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project		Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.5 Traffic Management Center(s)							
1.5.1 Interim Control Facilities(s) Design							
Study or Design:		$75,000	$0	$0	$0	$0	$75,000
Construction:		$0	$0	$0	$0	$0	$0
Other 0 & M:		$0	$0	$0	$0	$0	$0
	1.5.1 Subtotal	$75,000	$0	$0	$0	$0	$75,000
1.5.2 Interim Control Facilitie(s) Implementation							
Study or Design:		$0	$0	$0	$0	$0	$0
Construction:		$0	$250,000	$0	$0	$0	$250,000
Other 0 & M:		$0	$0	$25,000	$25,000	$0	$50,000
	1.5.2 Subtotal	$0	$250,000	$25,000	$25,000	$0	$300,000
1.5.3 Permanent Control Facilities(s) Design							
Study or Design:		$0	$0	$0	$0	$100,000	$100,000
Construction:		$0	$0	$0	$0	$0	$0
Other 0 & M:		$0	$0	$0	$0	$0	$0
	1.5.3 Subtotal	$0	$0	$0	$0	$100,000	$100,000
1.5.4 Permanent Control Facilities Implementation							
Study or Design:		No Activity Scheduled for Years 1 - 5					
Construction:							
Other 0 & M:							
	1.5.4 Subtotal						
	Project 1.5 Total	$75,000	$250,000	$25,000	$25,000	$100,000	$475,000

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4

Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project		Year 1	Year 2	Year3	Year 4	Year 5	Total
10 ADVANCED TRAFFIC SIGNAL CONTROL PROJECTS							
2.1 Normal Operations							
2.1.1 Scheduled Timing Plan Updates							
Study or Design:		$440,000	$440,000	$440,000	$440,000	$438,000	$2,198,000
CosntructionL		$0	$0	$0	$0	$0	$0
Other 0 & M:		$0	$0	$0	$0	$0	$0
	2.1.1 subtotal	$440,000	$440,000	$440,000	$440,000	$438,000	$2,198,000
2.1.2 Microprocessor Controller Conversions							
Study or Design:		$0	$0	$0	$0	$0	$0
Construction:		$230,000	$230,000	$230,000	$230,000	$220,000	$1,140,000
Other 0 & M:		$0	$0	$0	$0	$0	$0
	2.1.2 Subtotal	$230,000	$230,000	$230,000	$230,000	$220,000	$1,140,000
2.1.3 Coordmated Traffic Signal System Improvements - Phase I							
Study or Design:		$18,000	$20,000	$0	$0	$0	$38,000
Construction:		$157,000	$180,000	$0	$0	$0	$337,000
Other 0 & M:		$0	$0	$0	$0	$0	$0
	2.1.3 Subtotal	$175,000	$200,000	$0	$0	$0	$375,000
2.14 Coordinated Traffic Signal System Improvements - Phase II							
Study or *Design:*		$0	$0	$35,000	$35,000	$37,500	$107,500
Construction:		$0	$0	$315,000	$315,000	$337,500	$967.500
Other 0 & M:		$0	$0	$0	$0	$0	$0
	2.1.4 Subtotal	$0	$0	$350,000	$350,000	$375,000	$1,075,000
2.1.5 Coordinated Traffic Signal System Improvements - Phase III							
Study or Design:		No Activity Scheduled for Years 1 - 5					
Construction:							
Other 0 & M:							
	2.1.5 Subtotal						
2.1.6 Coordinated Traffic Signal System Improvements - Phase IV							
Study or Design:		No Activity Scheduled for Years 1 - 5					
Conatruction:							
Other 0 & M:							
	2.1.6 Subtotal						
2.1.7 Highway/Railroad Intersection Study							
Study or Design:		$75,000	$0	$0	$0	$0	$75,000
Construc tionL		$0	$0	$0	$0	$0	$0
Other 0 & M:		$0	$0	$0	$0	$0	$0
	2.1 .7 Subtotal	$75,000	$0	$0	$0	$0	$75,000
2.1.8 Highway/Railroad Intersection Improvements							
Study or Design:		$0	$10,000	$10,000	$10,000	$10,000	$40,000
Construction:		$0	$90,000	$90,000	$90,000	$90,000	$360,000
Other 0 & M:		$0	$0	$0	$0	$0	$0
	2.1.8 Subtotal	$0	$100,000	$100,000	$100,000	$100,000	$400,000
	Project 2.1 Total	$920,000	$970,000	$1,120,000	$1,120,000	$1,133,000	$5,263,000

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4
Miami Valley ITS - conceptual Implementation Cost

Program Area/Project		Year 1	Year 2	Year 3	Year 4	Year 5	Total
2.0 ADVANCED TRAFFIC SIGNAL CONTROL PROJECTS							
2.2 Non-Recurring Conditions							
2.2.1 Emergency Vehicle Preemption Study							
Study or Design:		$0	$0	$125,000	$0	$0	$125,000
Construction:		$0	$0	$0	$0	$0	$0
Other O & ML		$0	$0	$0	$0	$0	$0
	2.2.1 Subtotal	$0	$0	$125,000	$0	$0	$125,000
2.2.2 Freeway Traffic Diversion Timing Plans							
Study or Design:		$62,500	$62,500	$0	$0	$0	$125,000
Construction:		$0	$0	$0	$0	$0	$0
Other O & ML		$0	$0	$0	$0	$0	$0
	2.2.2 Subtotal	$62,500	$62,500	$0	$0	$0	$125,000
2.2.3 Special Event Timing Plans and Procedures							
Study or Design		$100,00	$100,000	$0	$0	$0	$200,000
Construction:		$0	$0	$0	$0	$0	$0
Other O & M:		$0	$0	$0	$0	$0	$0
	2.2.3 Subtotal	$100,000	$100,000	$0	$0	$0	$200,000
	Project 2.2 Total	$162,500	$162,500	$125,000	$0	$0	$450,000
2.3 Institutional Issues							
2.3.1 Interagency Coordination/Cooperation Committee		All Implementation Costs are Reflected in Staffing Estimates					
Study or Design:							
Construction:							
Other O & M:							
	Project 2.3 Total						

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 1.4

Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project	Year 1	Year 2	Year 3	Year 4	Year 5	Total
3.0 PUBLIC TRANSPORTATION SYSTEMS						
3.1 Automatic Vehicle Location Systems						
3.1.1 MVRTA automatic vehicle location & schedule adherence monitoring.						
Study or Design:	$50,000	$50,000	$0	$0	$0	$100,000
Construction	$956,250	$956,250	$0	$0	$0	$1,912,500
Other O &M:	$0	$95,625	$191,250	$191,250	$191,250	$669,375
3.1.1 Subtotal	$1,006,250	$1,101,875	$191,250	$191,250	$191,250	$2,681,875
3.1.2 MVRTA connection protection program.						
Study or Design:	$0	$50,000	$0	$0	$0	$50,000
Construction:	$0	$0	$0	$0	$0	$0
Other O& M:	$0	$0	$0	$0	$0	$0
3.1.2 Subtotal	$0	$50,000	$0	$0	$0	$50,000
3.1.3 MVRTA fixed-route deviation transit service.						
Study or Design:	$0	$0	$25,000	$25,000	$25,000	$75,000
Construction:	$0	$0	$0	$0	$0	$0
Other O & M:	$0	$0	$0	$0	$0	$0
3.1.3 Subtotal	$0	$0	$25,000	$25,000	$25,000	$75,000
3.1.4 MVRTA general public demand responsive service.						
Study or Design:						
Construction:		**No Activity Scheduled for Years 1 - 5**				
Other O & M:						
3.1.4 Subtotal						
3.1.5 SCAT automatic vehicle location & schedule adherence monitoring.						
Study or Design:						
Construction:		**No Activity Scheduled for Years 1 - 5**				
Other O & M:						
3.1.5 Subtotal						
3.1.6 Project Mobility "smart" technologies.						
Study or Design:	$0	$0	$55,000	$55,000	$55,000	$165,000
Construction:	$0	$0	$78,300	$78,300	$78,300	$234,900
Other O& M:	$0	$0	$0	$7,830	$15,660	$23,490
3.1.6 Subtotal	$0	$0	$133,300	$141,130	$148,960	$423,390
3.1.7 **SCAT** "smart" paratransit technologies.						
Study or Design:						
Construction:		**No Activity Scheduled for Years 1 - 5**				
Other O & M:						
3.1.7 Subtotal						
3.1.8 Miami County "smart" technologies.						
Study or Design:						
Construction:		**No Activity Scheduled for Years 1 - 5**				
Other O & M:						
3.1.8 Subtotal						
3.1.9 Technical support for regional human service transportation provider coordination.						
Study or Design:						
Construction:		**No Expenses Scheduled for Years 1 - 5**				
Other O & M:						
3.1.9 Subtotal						
Project 3.1 Total	$1,006,250	$1,151,875	$349,550	$357,380	$365,2101	$3,320,265

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4

Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project	Year 1	Yenr 2	Year 3	Year 4	Year 5	Total
3.2 Automated On-Board Fare and Data Collection						
3.2.1 MVRTA automated collection of run time, passenger loading and mileage data,						
Study or Design:	*$0*	$37,500	$37,500	$37,500	$0	$ 112,500
Construction:	$0	$1,062,500	$1,062,500	$1,062,500	$0	$3,187,500
Other O & M:	$0	$0	$106,250	$212,500	$318,750	$637,500
3.2.1 Subtotal	$0	$1,100,000	$1,206,250	$1,312,500	$318,750	$3.937,500
3.2.2 SCAT automated collection of run time, passenger loading and mileage data.						
Study or Design:					$10,500	$10,500
Construction:	$0	$0	$0	$0	$3I,250	$31,250
Other O & M:	$0	$0	$0	$0	$0	$0
3.2.2 Subtotal	$0	$0	$0	$0	$41,750	$41,750
3.2.3 MVRTA electronic fare collection.						
Study or Design:		**No Activity Scheduled for Years 1 - 5**				
Constrttction:						
Other O & M:						
3.2.3 Subtotal						
3.2.4 SCAT electronic fare collection.						
Study or Design:		**No Activity Scheduled for Years 1 - 5**				
Construction:						
Other O & M:						
3.2.4 Subtotal						
Project 3.2 Total	$0	$1,100,000	$1,206,250	$1,312,500	$260,500	$3,979,250
3.3 **Regional Mobility Management**						
3.3.1 Mobility management demonstration.						
Study or Design:		**No Activity Scheduled for Years 1 - 5**				
Construction:						
Other O & M:						
Project 3.3 Total						

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4

Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project		Year 1	Year 2	Year 3	Year 4	Year 5	Total
3.4 Transit Traveler Information							
3.4.1 MVRTA electronic station displays.							
Study or Design:		$0	$50,000	$50,000	$0	$0	$100,000
Construction:		$0	$175,000	$175,000	$0	$0	$350,000
Other O & M:		$0	$0	$17,500	$35,000	$35,000	$87,500
	3.4. I Subtotal	$0	$225,000	$242,500	$35,000	$35,000	$537,500
3.4.2 SCAT electronic station displays							
Study or Design:			**No Activity Scheduled for Years 1 - 5**				
Construction:							
Other O & M:							
	3.4.2 Subtotal						
3.4.3 MVRTA on-board annunciators and automatic visual information signage.							
Study or Design:		$0	$0	$0	$0	$0	$0
Construction:		$0	$0	$4,250,000	$4,250,000	$4,250,000	$12,750,000
Other O & M:		$0	$0	$0	$425,000	$850,000	$1,275,000
	3.4.3 Subtotal	$0	$0	$4,250,000	$4,675,000	$5,100,000	$14,025,000
3.4.4 SCAT on-board annunciators and automatic information signage							
Study or Design:			**No Activity Scheduled for Years 1 - 5**				
Construction:							
Other O & M:							
	3.4.4 Subtotal						
	Project 3.4 Total	$0	$225,000	$4,492,500	$4,710,000	$5,135,000	$14,562,500
3.5 Transit Traffic Signal Priority Systems							
3.5.1 Regional transit traffic signal priority systems.			**No Activity Scheduled for Years 1 - 5**				
Study or Design:							
Construction:							
Other O & M:							
	Project 3.5 Total						
3.6 Data Connections to Traffic Management Systems							
3.6.1 Regional traffic management system(s) data feed(s).							
Study or Design;		$0	$0	$75,000	$0	$0	$75,000
Construction:		$0	$0	$7,500	$7,500	$7,500	$22,500
Other O & M:		$0	$0	$0	$0	$0	$0
	Project 3.6 Total	$0	$0	$82,500	$7,500	$7,500	$97,500

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TADLE 7.4

Miami Valley ITS Conceptual Implementation Costs

Program Area/Project	Year 1	Year 2	Year 3	Year 4	Year 5	Total
4.0 MULTIMODAL TRAVELER INFORMATION SYSTEM						
4.1 Central Data Server						
4.1.1 Develop snd implement central data server.						
Study or Design:	$200,000	$300,000	$50,000	$50,000	$50,000	$650,000
Construction	$0	$100,000	$34,000	$33,000	$33,000	$200,000
Other O & M	$6,000	$9,000	$1,500	$1,500	$1,500	$19,500
Project 4.1 Total	5206.000	f409.000	$85,500	$84,500	$84,500	$869,500
4.2 Traveler Information Dessemination						
4.2.1 Media reports						
Study or Design	*$50.000*	*$0*	*$0*	*$0*	$0	*$50.000*
Construction	$0	$25.600	$0	$0	$0	$25.000
Other O & M	$3,180	$3.180	$3.180	$3,180	$3.180	$15.900
4.2.1 *Subtotal*	553.180	$28.180	$3.180	$3,180	$3,180	$90,900
4.2.2 Automated telephone System						
Study or Design.	$100,000	$0	$0	$0	$0	$100,000
Construction	$0	$50,000	so	$0	$0	$50,000
Other O & M:	$11.400	$11,400	$11,400	811.400	$11.400	$57,000
4.2.2 *Subtotal*	$111,400	$6 1.400	$11,400	$11.400	511.400	5207.000
4.2.3 Cable television.						
Study or Design	$0	$0	$600,000	$0	$0	$600,000
Construction	$0	$0	$0	$200,000	$0	$200,000
Other O & M	$0	$0	$27,600	$27,600	$27,600	$82,800
4.2.3 Subtotal	$0	$0	$627,600	$227,600	$27,600	$882,800
4.2.4 Internet						
Study or Design.	$50,000	$0	$0	$0	$0	$50,000
Cosntruction	$0	$20,000	$0	$0	$0	$20,000
Other O & M:	$19,500	$19,500	$19,500	$19,500	$19,500	$97,500
4.2.4 Subtotal	$69,500	$39,500	$19,500	$19,500	$19,500	$167,500
4.2.5 In-vehicle devices						
Study or Design	$0	$0	$0	$0	$140,000	$140,000
Construction	$0	$0	$0	$0	$0	$0
Other O & M:	$0	$0	$0	$0	$0	$0
4.2.5 *Subtotal*	$0	$0	$0	$0	$140,000	$140,000
4 2.6 Kiosks.						
Study or Design	$0	$0	$0	$500,000	$0	$500,000
Construction:	$0	$0	$0	$0	$150,000	$150,000
Other O & M:	$0	$0	$0	$25,800	$25,800	$51,600
4.2.6 *Subtotal*	$0	$0	$0	$525,800	$175,800	$701,600
4 2.1 Pagers.						
Study or Design	$200,000	$0	$0	$0	$0	$200,000
Constuction	$0	$50,000	$0	$0	$0	$50,000
Other O & M	$7,680	$7,680	$7,680	$7,680	$7,680	$38,400
4.2.7 Subtotal	$207,680	$57,680	$7,680	$7,680	$7,680	$288,400
Project 4.2 Total	$441.760	$186,760	$669,360	$795.160	$385,160	$2,478,200
4.3 Pavement and Weather Sensors						
4.3.1 Establish network of pavement and weather sensors.						
Study or Design.	*$0*	550,000	$0	$0	$0	$50,000
Construction:	$0	$0	$170,000	$165,000	$165,000	$500,000
Other O & M	$0	$3,180	$3, 180	$3,180	$3,180	$12,720
Project 4.3 Total	$0	$53,180	$173,180	$168,180	$168,180	$562,720

Notes regarding "Other O & M" Costs

I. For all project phases except for In-Vehicle Devices, this cost assumes on-going software revision. maintenance and upkeep at 3% of design costs.
2. Media Reports assumes 2 phone lines @ $140/month
3. Automated Telephone System assumes 1O phone lines @ $700/month
4. Cable TV assumes aT-1 line @ $800/month
5. Internet assumes aT-I line and Internet connection @ $1,500/month
6. Kiosks assumes 10 phone lines nnd site power @ $900/month for 1O kiosks
7. Pagers and Pavement and Weather Sensors assume 2 phone lines each @ $140/month

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4

Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project	Year 1	Year 2	Year 3	Year 4	Year 5	Total
5.0 PUBLIC-PRIVATE PARTNERSHIPS						
5.1 Open Solicitations and Requests for Partnership Proposals						
Study or Design	$50,000	$50,000	$50,000	$50,000	$50,000	$250,000
Construction:	$0	$0	$0	$0	$0	$0
Other O & M	$0	$0	$0	$0	$0	$0
Project 5.1 Total	$50,000	$50,000	$50,000	$50,000	$50,000	$250,000
5.2 Service Patrols						
Study or Design	Costs to develop partnerships are included in Projects 5.1, 5.7 and in Program Area 1					
Construction:						
Other O &M						
Project 5.2 Total						
5.3 Traveler Information System						
Study or Design:	Costs to develop partnerships are included in Projec is 5. I, 5.7 and in Program Area 4					
Construction:						
Other O & M						
Project 5.3 Total						
5.4 Cellular Phone Incident Detection/Travel Information						
Study or Design:	Costs to develop partnerships are included in Projects 5.1, 5.7 and in Program Areas 1 and 4					
Construction:						
Other O & M:						
Project 5.4 Total						
5.5 Right-of-Way Installations						
Study or Design;	Costs to develop partnerships are included in Projects 5.1, 5.7 and in Program Area 1					
Construction:						
Other O & M:						
Project 5.5 Total						
5.6 Adopt-A-Device Program						
Study or Design:	Costs to develop partnerships are included in Projects 5. I, 5 7 and in Program Areas I and 4					
Construction:						
Other O & M:						
Project 5.6 Total						
5.7 Public-Private Partnership Outreach						
Study or Design:	$20,000	$20,000	$20,000	$20,000	$20,000	$100,000
Construction:	$0	$0	$0	$0	$0	$0
Other O & M:	$0	$0	$0	$0	$0	$0
Project 5.7 Total	$20,000	$20,000	$20,000	$20,000	$20,000	$100,000

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.4

Miami Valley ITS - Conceptual Implementation Costs

Program Area/Project	Year 1	Year 2	Year 3	Year 4	Year 5	Total
						$0
6.0 TECHNICAL AND PLANNING SUPPORT						$0
						$0
6.1 EDP Deployment Committee						$0
Study or Design:	$75,000	$75,000	$75,000	$75,000	$75,000	$375,000
Construction:	$0	$0	$0	$0	$0	$0
Other O & M:	$0	$0	$0	$0	$0	$0
Project 6.1 Total	$75,000	$75,000	$75,000	$75,000	$75,000	$375,000
6.2 Technical Support						
Study or Design:	$120,000	$200,000	$200,000	$200,000	$200,000	$920,000
Construction:	$0	$0	$0	$0	$0	$0
Other O & M:	$0	$0	$0	$0	$0	$0
Project 6.2 Total	$100,000	$200,000	$200,000	$200,000	$200,000	$920,000
6.3 Outreach/Education						
Study or Design:	$0	$100,000	$75,000	$75,000	$75,000	$400,000
Construction:	$75,000	$0	$0	$0	$0	$0
Other O & M:	$0	$0	$0	$0	$0	$0
Project 6.3 Total	$75,000	$100,000	$75,000	$75,000	$75,000	$400,000

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.5
Summary of Year 1 - 5 Miami Valley ITS - Conceptual Implementation Costs by Project

Program Area & Projects	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Program Area 1.0 Freeway/Incident Management Systems						
Project 1.1 - Freeway/Incident Detection & Verification						
Design/Study & Construction	$303,400	$1,412,000	$1,650,000	$1,815,000	$1,785,000	$6,965,400
Operations and Maintenance	$15,000	$30,400	$112,300	$197,900	$298,400	$654,000
Total Costs	$318,400	$1,442,400	$1,762,300	$2,012,900	$2,083,400	$7,619,400
Project 1.2 - Traveler Information						
Design/Study & Construction	$246,000	$740,000	$790,000	$1,135,000	$2,700,000	$5,611,000
Operations and Maintenance	$0	$0	$62,000	$74,000	$154,000	$290,000
Total Costs	$246,000	$740,000	$852,000	$1,209,000	$2,854,000	$5,901,000
Project 1.3 - Traffic Control						
Design/Study & Construction	$0	$100,000	$0	$0	$0	$100,000
Operations and Maintenance	$0	$0	$0	$0	$0	$0
Total Costs	$0	$100,000	$0	$0	$0	$100,000
Project 1.4 - Enhanced Incident Management						
Design/Study & Construction	$310,000	$675,000	$25,000	$25,000	$25,000	$1,060,000
Operations and Maintenance	$0	$10,000	$62,500	$65,000	$67,500	$205,000
Total Costs	$3 10,000	$685,000	$87,500	$90,000	592,500	$1,265,000
Project 1.5 - Traffic Management Centers						
Design/Study & Construction	$75,000	$250,000	$0	$0	$100,000	$425,000
Operations and Maintenance	$0	$0	$25,000	$25,000	$0	$50,000
Total Costs	$75,000	$250,000	$25,000	$25,000	$100,000	$475,000
Program Area 1.0 Total						
Design/Study& Constructior	$934,400	$3,177,000	$2.465.000	$2,975,000	$4,610,000	$14,161,400
Operations and Maintenance	$15,000	540,400	$261,800	$361,900	$519,900	$1,199,000
Total Costs	$949,400	$3,217,400	$2,726,800	$3,336,900	$5,129,900	$15,360,400
Program Area 2.0 Advanced Traffic Signal Control Systems						
Project 2.1 - Normal Operations						
Design/Study & Construction	$920,000	$970,000	$1,120,000	$1,120,000	$1,133,000	$5,263,000
Operations and Maintenance	$0	$0	$0	$0	$0	$0
Total Costs	*$920,000*	$970,000	$1,120,000	$1,120,000	$1,133,000	$5,263,0000
Project 2.2 - Non-Recurring Conditions						
Design/Study & Construction	$162,500	$162,500	$125,000	$0	$0	$4.50,000
Operations and Maintenance	$0	$0	$0	$0	$0	$0
Total Costs	*$* 162,500	$162,500	$125,000	$0	$0	$450.000
Project 2.3 - Institutional Issues						
Design/Study & Construction	$0	$0	$0	$0	$0	$0
Operations and Maintenance	$0	$0	$0	$0	$0	$0
Total Costs	$0	$0	$0	$0	$0	$0
Program Area 2.0 Total						
Design/Study & Constructior	$1,082,500	$1,132,500	$1,245,000	$1,120,000	$1,133,000	$5,7 13,000
Operations and Maintenance	$0	$0	$0	$0	$0	$0
Total Costs	$1,082,500	$1,132,500	$1,245,000	$1,120,000	$1,133,000	$5,713,000

Source: BRW, Inc., August 1997

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.5
Summary of Year 1 5 Miami Valley ITS - Conceptual Implementation Costs by Project

'rogram Area & Projects	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Program Area 3.0 Public Transportation Systems						
Project 3. I. Automatic Vehicle Location Systems						
Design/Study & Construction	$1,006,250	$1,056,250	$158,300	$158,300	$158,300	$2,537,400
Ooerations and Maintenance	$0	$95,625	$191,250	$199,080	$206.910	$692,865
Total Costs	$1,006,250	$1,151,875	$349,550	$357,380	$365,210	$3.230.265
Project 3.2.. Automated On-Board Fare & Data Collection						
Design/Study & Construction	$0	$1,,100,000	$1,100,000	$1,100,000	$41,750	$3.341.750
Operations and Maintenance	$0	$0	$106,250	$212,500	$318,750	$637,500
Total Costs	$0	$1,100,000	$1,206,2:	$1,312,500	$360,500	$3,979,250
Project 3.3. Regional Mobility Management						
Design/Study & Construction	$0	$01	$0	$0	$0	$0.
Operations and Maintenance	$0	$01	$0	$0	$0	$0
Total Costs	$0	$0	$0	$0	$0	$0
Project 3.4.Transit Traveler Information						
Design/Study & Construction	$0	$225,000	$4,475,000	$4,250,000	$4,250,000	$13,200,000
Operations and Maintenance	$0	$0	$17,500	$460,000	$885,000	$1,362,500
Total Costs	$0	$225,000	$4,492,500	$4,710,000	$5,135,000	$14,562,500
Project 3.5.Transit Traffic Signal Priority Systems						
Design/Study & Construction	$0	$0	$0	$0	$0	$0
Operations and Maintenance	$0	$0	$0	$0	$0	$0
Total Costs	$0	$0	$0	$0	$0	$0
Project 3.6 ·Data Connections to Traffic Management Systems						
Design/Study & Construction	$0	$0	$82,500	$7,500	$7,500	$97,500
Operations and Maintenance	$0	$0	$0	$0	$0	$0
Total Costs	$0	$0	$82,500	$7,500	$7,500	$97,500
Program Area 3.0 Total						
'Design/Study & Construction	$1,006,250	$2,381,250	$5,815,800	$5,515,800	$4,457,550	$19,176,650
Operations and Maintenance	$0	$95,625	$315,000	$871,580	$1,410,660	$2,692,865
Total Costs	$1,006,250	$2,476,875	$6,130,800	$6,387,380	$5,868,210	$21,869,515
Program Area 4.0 Multimodal Traveler Information System						
Project 4. I - Central Data Server						
Design/Study & Construction	$200,000	$400,000	$84,000	$83,000	$83,000	$850,000
Operations and Maintenance	$6,000	$9,000	$1,500	$1,500	$1,500	$19,500
Total Costs	$206,000	$409,000	$85,500	$84,500	$84,500	$869,500
Project 4.2 - Traveler Information Dissemination						
Design/Study & Construction	$400,000	$145,000	$600,000	$700,000	$290,000	$2,135,000
Operations and Maintenance	$41,760	$41,760	$69,360	$95,160	$95,160	$343,200
Total Costs	$441,760	$186,760	$669,360	$795,160	$385,160	$2,478,200
Project 4.3 - Pavement and Weather Sensors						
Design/Study & Construction	$0	$50,000	$170,000	$165,000	$165,000	$550,000
Operations and Maintenance	$0	$3,180	$3,180	$3,180	$3,180	$12,720
Total Costs	$0	$53,180	$173,180	$168,180	$168,180	$562,720
Program Area 4.0 Total						
Design/Study & Construction	$600,000	$595,000	$854,000	$948,000	$538,000	$3,535,000
Operations and Maintenance	$47,760	$53,940	$74,040	$99,840	$99,840	$375,420
Total Costs	$647,760	$648,940	$928,040	$1,047,840	$637,840	$3,910,420

Source: BRW, Inc., August 1997

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.5
Summary of Year 1 - 5 Miami Valley ITS - Conceptual Implementation Costs by Project

Program Area & Projects	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Program Area 5.0 Public - Private Partnerships						
Project 5.1 - Open Solicitations and Requests for Partnerships	$50,000	$50,000	$50,000	$50,000	$50,000	$250,000
Project 5.2 - Highway Helper Service Patrols		$0	$0	$0	$0	$0
Project 5.3 - Traveler Information System	$0	$0	$0	$0	$0	$0
Project 5.4 - Cellular Phone Incident Detection/Travel Information	$0	$0	$0	$0	$0	$0
Project 5.5 - Right-of-Way Installations	$0	$0	$0	$0	$0	$0
Project 5.6 - Adopt-A-Device Program						$0
Project 5.7 - Public - Private Partnership Outreach	$20,000	$0	$20,000	$20,000	$20,000	$100,000
Program Area 5.0 Total	$70,000	$70,000	$70,000	$70,000	$70,000	$350,000
Note: All costs shown for Program Area 5 are for Study/Design						
Program Area 6.0 Technical and Planning Support						
Project 6.1 - EDP Deployment Committee	$75,000	$75,000	$75,000	$75,000	$75,000	$375,000
Project 6.2 - Technical Support	$100,000	$200,000	$200,000	$200,000	$200,000	$900,000
Project 6.3 - Outreach/Education	$75,000	$100,000	$75,000	$75,000	$75,000	$400,000
Program Area 6.0 Total	$250,000	$375,000	$350,000	$350,000	$350,000	$1,675,000
Note: All costs shown for Program Area 6 are for Study/Design						
PLAN TOTAL	$4,005,910	$7,920,715	$11,450,640	$12,312,120	$13,l88,950	$48,878,335

Source: BRW, Inc., August 1997

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.5.1
Summary of Year 1 - 5 Miami Valley ITS - Conceptual Implementation Costs by Program Area

Program Area & Projects	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Program Area 1.0 Freeway/Incident Management Systems						
Design/Study & Construction	$934,400	$3,177,000	$2,465,000	$2,975,000	$4,610,000	$14,161,400
Operations and Maintenance	$15,000	$40,400	$261,800	$361,900	$519,900	$1,199,000
Total Costs	$949,400	$3,217,400	$2,726,800	$3,336,900	$5,129,900	$15,360,400
Program Area 2.0 Advanced Traffic Signal Control Systems						
Design/Study & Construction	$1,082,500	$1,132,500	$1,245,000	$1,120,000	$1,133,000	$5,713,000
Operations and Maintenance	$0	$0	$0	$0	$0	$0
Total Costs	$1,082,500	$1,132,500	$1,245,000	$1,120,000	$1,133,000	$5,713,000
Program Area 3.0 Public Transportation Systems						
Design/Study & Construction	$1,006,250	$2,381,250	$5,815,800	$5,515,800	$4,457,550	$19,176,650
Operations and Maintenance	$0	$95,625	$315,000	$871,580	$1,410,660	$2,692,865
Total Costs	$1,006,250	$2,476,875	$6,130,800	$6,387,380	$5,868,210	$21,869,515
Program Area 4.0 Multimodal Traveler Information System						
Design/Study & Construction	***$600,000***	***$595,000***	***$854,000***	***$948,000***	***$538,000***	***$3,535,000***
Operations and Maintenance	***$47,760***	***$53,940***	***$74,040***	***$99,840***	***$99,840***	***$375,420***
Total Costs	$647,760	$648,940	$928,040	$1,047,840	$637,840	$3,910,420
Program Area 5.0 Public - Private Partnerships						
Total Costs	$70,000	$70,000	$70,000	$70,000	$70,000	$350,000
Note: All costs shown for Program Area 5 are for Study/Design						
Program Area 6.0 Technical and Planning Support						
Total Costs	$250,000	$375,000	$350,000	$350,000	$350,000	$1,675,000
Note: All ***costs shown for Program Area 6 are for Study/Design***						
PLAN TOTAL						
Design/Study & Construction	$3,623,150	$7,285,750	$10,379,800	$10,558,800	$10,738,550	$42,586,050
Operations and Maintenance	$62,760	$189,965	$650,840	$1,333,320	$2,030,400	$4,267,285
Total Costs	$4,005,910	$7,920,715	$11,450,640	$12,312,120	$13,188,950	$48,878,335

Source: BRW, Inc., August 1997

All Costs Assume 100% Public Funding (Assumes No Private Sector Contributions)

TABLE 7.6
Estimates Annual Public Agency Labor Requirements in Full Time Equivalents (1)

			Year		
Program Area/Project	**1**	**2**	**3**	**4**	**5**
Freeway Management System					
Freeway Service Patrol Drivers		2.0	4.0	6.0	8.0
Freeway Management System Staff (2)		3.0	4.0	5.0	6.0
Management of Consultants	1.0	1.5	0.5	0	0
Subtotal Labor	1.0	6.5	8.5	11.0	14.0
Advanced Traffic Signal Control					
Management of Consultants	1.5	1.5	1.5	1.5	1.5
Public Transportation Systems					
AVL and Schedule Adherence Monitoring			1.0	1.0	1.0
Technical Support for HSA Coordination		0.05	0.05	0.05	0.05
Automated On-Board Fare and Data Collection			0.1	0.1	0.1
Electronic Station displays		0.05	0.05	0.05	0.05
Regional Traffic Management Systems Linkage		0.05	0.1	0.15	0.2
Management of Consultants	0.5	1.0	1.0	1.0	1.0
Subtotal Labor	0.50	1.15	2.30	2.35	2.40
Multi-Modal Traveler Information System					
Central Data Server	0.5	0.5	0.5	0.5	0.5
Traveler Information Dissemination	0.3	0.3	0.45	0.45	0.45
Pavement and Weather RFPP's	(3)	(3)	(3)	(3)	(3)
Management of Consultants	1.5	0.5	1.5	1.5	0.25
Subtotal Labor	2.3	1.3	2.45	2.45	1.2
Public-Private Partnerships					
Open Initiatives and RFPP's	0.2	0.2	0.2	0.2	0.2
Public-Private Partnership Outreach	0.2	0.2	0.2	0.2	0.2
Management of Consultants	0.05	0.05	0.05	0.05	0.05
Subtotal Labor	0.45	0.45	0.45	0.45	0.45
Technical and Planning Support					
ITS Deployment Committee	1.5	1.5	1.5	1.5	1.5
Outreach/Education	0.25	0.25	0.25	0.25	0.25
Management of Consultants	0.05	0.05	0.05	0.05	0.05
Subtotal Labor	1.8	1.8	1.8	1.8	0.8
TOTAL LABOR	**7.55**	**12.7**	**17**	**19.55**	**21.35**

Notes:

1. Non-agency labor (consultants, etc.) is accounted for elsewhere (in the Study/Design category of implementation costs) Staffing estimates reflect the cumulative resources required among the principal public transportation agencies involved in regional ITS deployment. For example, the labor requirements for the ITS Deployment Committee are the sum total of all participating agencies.

2. Freeway Management System Operators include managerial, technical and support staff with responsibilities include Freeway Service Patrol supervision, CMS, CCTV, Celluar Hotline, Detection System, HAR and Incident Management

3. Maintenance is assumed to be contracted out

4. All estimates reflect 100 percent public operation of facilities/services (e.g., no privately operated traveler information system, etc.)

Source: BRW, Inc.; July 1997

Table 7.7
Miami Valley ITS - Implementation Schedule

Program Area/Project	Immediate *(Years 1 - 2)*	Short-Term *(Years 3 - 5)*	Mid-Term *(Years 6 - 10)*	Long-Term *(years 11- 20)*
1.0 FREEWAY/INCIDENT MANAGEMENT SYSTEMS				
1.1 Detection/Verification				
1.1.1 Service Patrols				
1.1.2 Phase I - Detection System				
1.1.3 Phase II - Detection system				
1.1.4 Regional Cellular Hotline Incident Reporting System				
1.1.5 Phase I - CCTV Camera System				
1.1.6 Phase II - CCTV Camera System				
1.1.7 Phase III - CCTV Camera System				
1.1.8 Phase I - Enhanced Reference Markers				
1.1.9 Phase II - Enhanced Reference Markers				
1.2 Traveler Information				
1.2.1 Phase I - Freeway CMS				
1.2.2 Phase II - Freeway CMS				
1.2.3 Phase III - Freeway CMS				
1.2.4 Highway Advisory Radio				
1.2.5 Major Generator/Local ATIS Study				
1.2.6 Major Generator/Local ATIS Implementation				
1.3 Traffic Control				
1.3.1 Ramp Meter Study				
1.3.2 Ramp Meter Implementation				
1.4 Enhanced Incident Management				
1.4.1 Portable Traffic Management System				
1.4.2 Regional Incident Management Task Force & Regional Memorandum of Understanding				
1.4.3 Regional Incident Management Program Plan				
1.4.4 I-75 Incident Management Operational Plan				
1.4.5 I-75 Incident Management System				
1.4.6 Regional Incident Management System				
1.5 Traffic Management Facilities				
1.5.1 Interim Control Facilities(s) Design				
1.5.2 Interim Control Facilities(s) Implementation				
1.5.3 Permanent Control Facilities(s) Design				
1.5.4 Permanent Control Facilities(s) Implementation				

Source: BRW, Inc. Dec-97

Table 7.7
Miami Valley ITS - Implementation Schedule

Program Area/Project	Immediate *(Years 1 - 2)*	Short-Term *(Years 3 - 5)*	Mid-Term *(Years 6 - 10)*	Long-Term *(years 11- 20)*
2.0 ADVANCED TRAFFIC SIGNAL CONTROL SYSTEMS				
2.1 Normal Operations				
2.1.1 Scheduled Timing Updates				
2.1.2 Microprocessor Controller Conversions				
2.1.3 Coordinated Traffic Signal System Improvements - Phase 1				
2.1.4 Coordinated Traffic Signal System Improvements - Phase 2				
2.1.5 Coordinated Traffic Signal System Improvements - Phase 3				
2.1.6 Coordinated Traffic Signal System Improvements - Phase 4				
2.1.7 Highway/Railroad Intersection Study				
2.1.8 Highway/Railroad Intersection Implementation				
2.2 Non-Recurring Conditions				
2.2.1 Phase I - Freeway CMS				
2.2.2 Phase II - Freeway CMS				
2.2.3 Phase III - Freeway CMS				
2.3 Institutional Issues				
2.3.1 Ramp Meter Study				

Source: BRW, Inc. Dec-97

Table 7.7
Miami Valley ITS - Implementation Schedule

Program Area/Project	Immediate *(Years 1 - 2)*	Short-Term *(Years 3 - 5)*	Mid-Term *(Years 6 - 10)*	Long-Term *(years 11- 20)*
3.0 PUBLIC TRANSPORTATION SYSTEMS				
3.1 Automatic Vehicle Location systems				
3.1.1 MARTA Automatic Vehicle Location & Schedule Adherence Monitoring				
3.1.2 MVRTA Connection Protection Program				
3.1.3 MVRTA Fixed-Route Demand Responsive Service				
3.1.4 MVRTA General Public Demand Responsive Service				
3.1.5 SCAT Automatic Vehicle Location & Schedule Adherence Monitoring				
3.1.6 Project Mobility "Smart" Technologies				
3.1.7 SCAT "Smart" Paratransit Technologies				
3.1.8 Miami County "Smart" Technologies				
3.1.9 Technical Support for regional Human Service Transportation Provider Coordination				
3.2 Automated ON-Board Fare and data Collection				
3.2.1 MVRTA Automated Collection of Run Time, Passenger Loading and Mileage Data				
3.2.2 SCAT Automated Collection of Run Time, Passenger Loading and Mileage Data				
3.2.3 SCAT Electronic Fare Collection				
3.3 Regional Mobility Management				
3.3.1 Mobility Management Demonstration				
3.4 Transit Traveler Information				
3.4.1 MVRTA Electronic Station Displays				
3.4.2 SCAT Electronic Station Displays				
3.4.3 MVRTA On-Board Annunciators and Automatic Visual Information Signage				
3.4.4 SCAT On-Board Annunciators and Automatic Information Signage				
3.5 Transit Traffic Signal Priority Systems				
3.5.1 Regional Transit Traffic Signal Priority Systems				
3.6 Coordination with Traffic Management and Traveler Inforamtin Systems				
3.6.1 Regional Traffic Management and Traveler Informatio System Data Feed				

Source: BRW, Inc. Dec-97

Table 7.7
Miami Valley ITS - Implementation Schedule

Program Area/Project	Immediate *(Years 1 - 2)*	Short-Term *(Years 3 - 5)*	Mid-Term *(Years 6 - 10)*	Long-Term *(years 11- 20)*
4.0 MULTIMODAL TRAVELER INFORMATION SYSTEM				
4.1 Central Data Server				
3.1.1 MARTA Automatic Vehicle Location & Schedule Adherence Monitoring				
4.2 Traveler Information Dissemination				
4.2.1 Media Reports				
4.2.2 Automated Telephone System				
4.2.3 Cable Television				
4.2.4 Internet				
4.2.5 In-Vehicle Devices				
4.2.6 Kiosk				
4.2.7 Pagers				
4.3 Pavement and Weather Sensors				
4.3.1 Phase I - Pavement & Weather Sensors				
4.3.2 Phase II - Pavement & Weather Sensors				
4.3.3 Expand to Remainder of Freeway System				

Source: BRW, Inc. Dec-97

Table 7.7

Miami Valley ITS - Implementation Schedule

Program Area/Project	Immediate *(Years I - 2)*	Short-Term *(Years 3 - 5)*	Mid-Term *(Years 6 - 10)*	Long-Term *(Years II - 20)*
5.0 PUBLIC-PRIVATE PARTNERSHIPS				
5.1 Highway Helper Service Patrols	▨	▨	▨	▨
5.2 Traveler Information System	▨	▨	▨	▨
5.3 Cellular Phone Incident Detection/Travel Information		▨	▨	▨
5.4 Right-of-Way Installations	▨	▨	▨	▨
5.5 Adopt-A-Device Program	▨	▨	▨	▨
5.6 Public-Private Partnership Outreach	▨	▨	▨	▨

Source: BRW, Inc. Dee-97

Table 7.7

Miami Valley ITS - Implementation Schedule

Program Area/Project	Immediate *(Years I - 2)*	Short-Term *(Years 3 - 5)*	Mid-Term *(Years 6 - 10)*	Long-Term *(Years II - 20)*
6.0 TECHNICAL AND PLANNING SUPPORT				
6.1 EDP Deployment Committee				
6.1. Assist With Formation of Committees and Organizational Support	▨			
6.1.2 Committee Administration and Coordination Services	▨	▨	▨	▨
6.1.3 Decision Support Services	▨	▨	▨	▨
6.2 Technical Support				
6.2.1 Develop Project Plans, Solicitations and Evaluations	▨	▨	▨	▨
6.2.2 Lead Projects as Directed	▨	▨	▨	▨
6.2.3 Coordinate Miami Valley Plan with Local, State and National Plans	▨	▨	▨	▨
6.3 Outreach/Education				
6.3.1 Public Information Center	▨	▨	▨	▨
6.3.2 Public Outreach and Education	▨	▨	▨	▨
6.3.4 Internal Education and Interagency Involvement	▨	▨	▨	▨

Source: BRW, Inc. Dee-97

TABLE 7.8
OVERVIEW OF REGIONAL ITS DEPLOYMENT MILESTONES:
YEARS I-5

YEAR	ACCOMPLISHMENTS BY PROGRAM AREA
1	
	1 - Freeway/Incident Management:
	Service Patrols operational in highest priority locations
	Detailed Designs for Phase 2 I-75 F/IMS (CCTV, CMS. Detection)
	Enhanced Reference Marker installation underway
	Major Generator/Local ATIS Projects identified
	Portable Traffic Management System operational
	Regional Incident Management Plan and Memorandum of Understanding
	Detailed Designs for Freeway/Incident Management Control Facility
	2 - Advanced Traffic Control Systems:
	Timing Plan Updates at 220 traffic signals
	Convert 23 traffic signals to Microprocessor Controllers
	Coordinated Traffic Signal System Improvements at 7 traffic signals
	Regional Highway/Railroad Intersection recommendations
	Freeway Traffic Diversion Plans developed
	2 Special Event Timing Plans implemented
	Interagency Coordination Committee
	3 - Public Transportation Systems:
	MVRTA AVL & Schedule Adherence implementation underway
	4 - Multimodal Traveler Information System:
	Detailed Design for Central Data Server underway
	Strategy for Media Reports
	Detailed Design for Automated Phone System
	Detailed Design for Internet
	Detailed Design for Pagers
2	
	1 - Freeway/Incident Management:
	Service Patrol coverage expanded
	Phase 1 I-75 F/IMS (CCTV, CMS, Detection) under construction
	Interim F/IMS Control Facilities operational
	Enhanced Reference Markers installed on I-7.5
	Detailed Designs for Major Generator/Local ITS Projects
	Regional Ramp Metering Recommendations
	I-75 Incident Management System operational
	Regional Expansion of Incident Management System underway
	2 - Advanced Traffic Control Systems:
	Timing Plan Updates at 220 traffic signals
	Convert 23 traffic signals to Microprocessor Controllers
	Coordinated Traffic Signal System Improvements at 6 traffic signals
	Highway/Railroad Crossing #l implemented
	Freeway Traffic Diversion Plans operational
	2 Special Event Timing Plans implemented
	3 - Public Transportation Systems:
	MVRTA AVL & Schedule Adherence operational
	MVRTA Connection Protection Program operational
	Technical Support for HSA Coordination
	Detailed Design for MVRTA Automated Fare and Data Collection system
	Detailed Designs for MVRTA Electronic Station Displays
	4 - Multimodal Traveler Information System:
	Central Data Server operational
	Media Reports operational
	Automated Phone System operational
	Internet operational
	Pagers operational
	Detailed Design for Pavement and Weather Sensors

Source: BRW, Inc., July 1997.

TABLE 7.8
OVERVIEW **OF REGIONAL ITS DEPLOYMENT MILESTONES:**
YEARS 1 -5

YEAR	ACCOMPLISHMENTS BY PROGRAM AREA
3	
	1 -Freeway/IncidentManagement:
	Service Patrol coverage expanded
	Portions of Phase 1 I-75 F/IM.S (CCTV, CMS, Detection) operational
	Detailed Design for Cellular Hotline Incident Reporting System complete
	Major Generator/Localized ATIS Location #l operational
	Portions of Phase 2 F/IMS (CCTV, CMS, Detection) under construction
	Regional Expansion of Incident Management System continuing
	2 - Advanced Traffic Control Systems:
	Timing Plan Updates at 220 traffic signals
	Convert 23 traffic signals to Microprocessor Controllers
	Coordinated Traffic Signal System Improvements at 13 traffic signals
	Highway/Railroad Crossing #2 implemented
	Emergency Vehicle Preemption recommendations
	3 - Public Transportation Systems:
	Detailed Design for Project Mobility "Smart" Technologies
	MVRTA Automated Fare & Data Collection system phased implementation
	MVRTA Electronic Station Displays operational
	Detailed Designs for MVRTA On-Board Annunciators and Visual Signage
	Connection to F/IMS Control Facilities
	4 - Multimodal Traveler Information System:
	Phase 1 Pavement and Weather Sensors opertional
	Detailed Design for Cable TV system
4	
	1 -Freeway/IncidentManagement:
	Service Patrol coverage expanded
	Expansion of Phase 1 I-75 F/lMS (CCTV, CMS, Detection) operational
	Portions of Phase 2 F/IMS (CCTV, CMS, Detection) operational
	Regional Cellular Hotline Incident Reporting System under construction
	Detailed Design for Regional Highway Advisory Radio completed
	Detailed Design for Major Generator/Localized ATIS #2 completed
	Regional Expansion of Incident Management System continuing
	2 - Advanced Traffic Control Systems:
	Timing Plan Updates at 220 traffic signals
	Convert 23 traffic signals to Microprocessor Controllers
	Coordinated Traffic Signal System Improvements at 13 traffic signals
	Highway/Railroad Crossing #3 implemented
	3 - Public Transportation Systems:
	Project Mobility "Smart" Technologies operational
	MVRTA On-Board Annunciators & Visual Signage phased implementation
	4 - Multimodal Traveler Information System:
	Phase 2 Pavement and Weather Sensors operational
	Cable TV system operational
	Detailed Design for Kiosk system

Source: BRW, Inc., July 1997.

TABLE 7.8
OVERVIEW OF REGIONAL ITS DEPLOYMENT MILESTONES:
YEARS l-5

YEAR	ACCOMPLISHMENTS BY PROGRAM AREA
	1 - **Freewy/Incident Management:**
	Service Patrol coverage expanded
	Phase l and Phase 2 F/IMS (CCTV, CMS, Detection) operational
	Regional Cellular Hotline Incident Reporting System operational
	Regional Highway Advisory Radio operational
	Major Generator/Localized ATIS #2 operational
	Detailed Designs for Permanent F/IMS Control Facilities complete
	2 - Advanced Traffic Control Systems:
	Timing Plan Updates at 219 traffic signals
	Convert 22 traffic signals to Microprocessor Controllers
	Coordinated Traffic **Signal** System Improvements at **14** traffic signals
	Highway/Railroad Crossing #4 implemented
	3 - **Public Transportation Systems:**
	MVRTA Fixed Route Deviation Service Strategy
	SCAT Automated Fare and Data Collection system operational
	MVRTA On-Board Annunciators & Visual Signage phased implementation
	4 - Multimoddal Traveler Information System:
	Phase 3 Pavement and Weather Sensors onerational
	Kiosk system operational

Source: BRW, Inc., July 1997.

considering deployment of any system or project noted in this Strategic Deployment Plan careful consideration should be given to the following funding considerations:

- What level of local and state funding support is committed to the deployment of the system?
- Will deployment of the system reduce operating costs or increase them, and over what time period will these impacts take place?
- What funding sources are available to fund operations and maintenance expenses? Are these sources stable or unstable?
- Are innovative funding approaches possible? Does private industry have a role to play, and should there be a public/private partnership?
- Does the public understand the project and/or system? Will they support it, and would a special funding initiative be possible?

In general, it should be anticipated that dedicated federal funds will only be made available for initial deployment and, in some cases, the first couple of years of operations and maintenance. As a part of the study/design periods defined in the deployment timeline of the Strategic Deployment Plan, the funding considerations listed above, at a minimum, should be addressed. Each system should have its own financial plan indicating how its short and long-term deployment funding, as well as how operations and maintenance funding needs will be addressed.

7.5.1 Available Funding Sources

A number of funding sources are available to support ITS deployment, with the more significant sources discussed below.

Federal Funding Sources

Traditionally federal funds have driven much of the ITS research and deployment. The Miami Valley was successfully in acquiring federal funds in support of this Strategic Deployment Plan. Competition for federal funds is sometimes intense, however, and future funding levels are uncertain.

There are several federal funding sources to be considered as they relate to ITS deployment efforts:

- Intermodal Surface Transportation Efficiency Act (ISTEA)

  ISTEA was adopted in December 199 1. It brought new focus to the concept of ITS while retaining most of the previous program areas There are four specific areas of ISTEA that closely relate to ITS, and may be utilized for deployment funding.

Surface Transportation Program (STP)

Traffic management and traffic control facilities are eligible under this program. Projects may provide improved efficiency to freeway and highway operations, and funds are provided directly to the Counties with populations over 200,000 based on population apportionment. Total funding for STP is $23.9 billion over the six year life of ISTEA. Operations and maintenance funding through STP is possible, but is difficult to obtain on any significant basis.

National Highway System (NHS)

STP and NHS are relatively similar programs, and the State can (if they desire) transfer these funds to their STP pool with DOT approval. The program is funded at $21 billion over the life of ISTEA, with an additional $ I7 billion available for Interstate Highways. NHS will support operations and maintenance funds for the first two years of project operation.

- Congestion Mitigation and Air Quality Improvement Program (CMAQ)

  Due to the impacts of ITS deployment on mobile emissions and fuel consumption, CMAQ has become a popular source for funding traffic signal and traffic management projects. The program includes $6 billion over the life of ISTEA. The question of "induced demand" is frequently raised in relation to traffic signal projects. Local match requirements range from 0 percent to 20 percent depending on the application and deployment location.

  Intelligent Vehicle Highway Systems (IVHS) Act

  Logically, IVHS (now ITS) is the specific focus of this Act. Funding is set for $660 million over the life of ISTEA, and local match requirements are 20 percent. Ozone non-attainment is a key factor in receiving these funds, as was supposedly being located within one of the four priority corridors. Earmarking has had a significant impact on the availability of these funds.

- Federal Transit Administration (FTA) Funds

  ISTEA identified $31.5 billion for transit funding across the nation. Both Section 3 and Section 9 potentially apply to ITS, as follows:

  Section 3 - Canital Program and Research Programs: Traditionally used to fund new bus acquisition, this Section will fund innovative techniques and practices for management and operations of public transit. A 20 percent local match is required. Availability of these funds for ITS purposes should be considered limited.

Section 9 - Formula Grant Program: Application of these funds to ITS capital expenses is very unlikely due to operational funding shortfalls, however the Section does allow for this action if need be.

Table 7.9 summarizes the applicability of the various funding sources discussed above to the Miami Valley ITS Program Areas.

TABLE 7.9
FEDERAL FUNDING SOURCE APPLICABILITY BY PROGRAM AREA

PROGRAM AREA	STP	NHS	CMAQ	FTA
Freeway/Incident Management Systems	●	●	O	N/A
Advanced Traffic Control Systems	●	●	O	N/A
Public Transportation Systems	R	R	●	●
Multi-Modal Traveler Information System	O	R	R	R
Operations and Maintenance Funding Supported by the Source (Y/N)	Y	Y	N	Y

Source: BRW, Inc., August 1997

Applicability: ● High; O Moderate; R Low; N/A None

State Funding Sources

The Ohio Department of Transportation currently does not have a dedicated funding source for ITS projects. However, ODOT has encouraged ITS planning and deployment and has participated in projects in Cincinnati and Columbus which have utilized CMAQ funds for both construction and operations and maintenance. The use of CMAQ funds in these areas for continued operations is not assured and no plans for alternate funding have been finalized.

Without a dedicated state funding program, ITS projects must compete with other "traditional" transportation projects for funding is ODOT's "Major New" project selection process. The Major New selection process was recently substantially revised to be more transparent and objective and to more effectively match project commitments to available resources. The new process utilizes a criteria-based formula which evaluates projects using three major goals plus a bonus category which includes two additional goals. The goals, individual evaluation criteria and associated maximum scores are presented in Table 7.10. The two bonus categories include criteria on which ITS projects can compete quite favorably.

TABLE 7.10
ODOT "MAJOR NEW" PROJECT SELECTION CRITERIA

Goals	Criteria	Maximum Score
1. Transportation Efficiency	Average Daily Traffic	20
	Volume to Capacity Ratio	20
	Roadway Classification	5
	Macro Corridor Completion	10
2. Safety	Accident Rate	10
Efficiency and Safety points account for at least 70% of a project's base score		***70***
3. Economic Development	Job Creation	10
	Job Retention	5
	Economic Distress	5
	Cost Effectiveness of Investment	5
	Level of Investment	5
Economic development points account for up to 30% of a project's base score		***30***
BONUS CATEGORIES		
4. Funding	Private/Public/Local Partnership	15
5. Unique Multi-Modal or Regional Impacts		10
Total possible points including Transportation, Economic Development and Bonus Categories		***125***

Source: Ohio Department of Transportation web page, May 9, 1997

Private Funding sources

It is envisioned that private investment will play a role in ITS deployment in the Miami Valley and Program Area 5 in Section 6.0 of this report identifies a number of specific projects with high partnership potential.

When considering whether or not an ITS project or portion of a project may have private funding potential agencies should place themselves in the "shoes" of private enterprise and consider these questions:

- What are the private risks involved in deploying this ITS project (consider public agency risks and multiple by two or more)?
- What is the rate of return that can be expected on this deployment, and is it greater than 10 percent?
- What is the pay-off time period, or when will the project begin to turn a profit?
- What are the up-front capital costs, and what is the current cost of that capital?
- What is the previous deployment and rate of return record of similar projects?

Private interests sometimes lack faith in the ability of government agencies to follow through on promises and agreements and this risk should be acknowledged by the sponsoring agencies and minimized. It is not expected that public agencies do all of the analysis leg work for potential private partners, however public agency sponsors should understand the viewpoint of private interests and should assist in answering questions and concerns

7.5.2 Federal Funding Trends

The ISTEA reauthorization legislative proposal is entitled the National Economic Crossroads Transportation Efficiency Act (NEXTEA). The ITS program in NEXTEA is found under Title VI (Research), Part B as the "Intelligent Transportation Systems Act of 1997". For ITS, NEXTEA continues the research and testing program started under ISTEA and contains a new federal deployment incentive category.

The research and testing program is proposed to be funded at a level of $96 million annually from 1998 through 2000, increasing to $130 million annually from 200 1 through 2003. The NEXTEA proposal funds the federal deployment incentives category at $100 million annually for all six years. It is expected that annual appropriations (GOE) will include approximately $50 million for the federal ITS program.

Table 7.11 displays the federal funding situation for FY 98 compared with FY 97. The FY 98 total proposed ITS budget of $250 million includes $54 in GOE (which is USDOT's discretionary spending) and $196 million in NEXTEA funds. In FY 97 the total ITS budget was $233.4 million which included $113 million from ISTEA and $120.4 in GOE funds. The total proposed FY 98 ITS budget represents a 7 percent increase over the FY 97 total ITS budget. The FY 98 GOE represents a 55 percent decrease from FY 97, but the proposed FY 98 NEXTEA funds are an increase of nearly 74 percent over FY 97 ISTEA funds.

TABLE 7.11
FISCAL YEAR 1998 TRANSPORTATION FUNDING
(IN THOUSANDS)

ITS Program/Activity	FY97 Actual Budget	FY 98 Proposed Budget		
		GOE	NEXTEA	TOTAL
Research and Development	32,900	33,000	12,500	45,500
Operational Tests	30,200		24,500	24,500
Automated Highway System	22,000		26,000	26,000
Architecture and Standards	12,200		13,000	13,000
Evaluation	3,500	9,000		9,000
Mainstreaming	12,100	3,000	19,000	22,000
Model Deployment	26,500			
Program/System Support	8,300	9,000	1,000	10,000
Corridors Program	85,700			
Deployment Incentives			100,000	100,000
TOTAL	233,400	54,000	196,000	250,000

Sources: FY 97 Actual Budget - USDOT Joint Program Office
FY 98 Proposed Budget - ITS America News, March 1997, Volume 7, Number 3

The earmarks for ITS operational tests totaled $63.45 for FY 97.The funds for these earmarks came from the $113 million authorized for ITS under ISTEA. A percentage of the FY 98 ITS funds will go toward earmarks as well.

NEXTEA retains virtually all the ISTEA programs. The ITS Corridors Program is replaced with the Intelligent Transportation Infrastructure Deployment Incentives Program. Currently designated Priority Corridors are eligible for this deployment incentives funding. The Interstate Maintenance program has been expanded under the NEXTEA proposal to include reconstruction of Interstate and infrastructure-based ITS capital improvements to the extent they improve the performance of the Interstate System.

7.6 PROJECT PROGRAMMING CONSIDERATIONS

7.6.1 Project and Prow-am Area Linkages

This section highlights some of the major linkages between recommended projects, focusing on both interdependencies and on projects which can provide important benefits as “stand alones". The recommended deployment schedule presented in Section 7.4 reflects the interdependencies among projects.

Care has been taken to develop a highly integrated ITS and, as described in Section 7.2, the deployment of each project should be pursued in light of its compatibility with and contribution to the regional system. However, the scope and complexity of the ultimate system should not discourage agencies from implementing projects which have limited resources and cannot be immediately and fully integrated with other system components. The recommended ITS can be implemented incrementally and relatively independent, “do-able” projects have been identified which can provide important benefits.

Major Linkages Within Program Areas

Freeway/Incident Management Systems

Table 7.12 identifies the major relationships among projects within the Freeway/Incident Management Systems program area. Projects with a blank “Depends Upon” column are those projects which can be implemented as stand-alone projects if necessary. These projects include freeway service patrols, ramp meters, portable traffic management systems, vehicle detection systems and CCTV cameras. As shown in Table 7.12, a number of projects in this program depend upon the basic detection and surveillance infrastructure, which have been recommended for immediate deployment.

TABLE 7.12
FREEWAY/INCIDENT MANAGEMENT PROJECT INTERRELATIONSHIPS

Depends Upon	PROJECT	Supports
• Detection System • CCTV Cameras • Enhanced Reference Markers	• CELLULAR HOTLINE SYSTEM	• Incident Management System • Overall Freeway/Incident Management Svstem
	• SERVICE PATROLS • RAMP METERS • PORTABLE TRAFFIC MGT.	• Incident Management System • Overall Freeway/Incident Management System
• Detection System • CCTV Cameras	• CHANGEABLE MESSAGE SIGNS System • HIGHWAY ADVISORY RADIO	• Incident Management • Overall Freeway/incident Management Svstem
	• DETECTION SYSTEM • CCTV CAMERAS	• Incident Management System • Overall Freeway/Incident Management System • Cellular Hotiine System • Changeable Message Signs • Highway Advisory Radio

Source: BRW, Inc., September 1997.

Advanced Traffic Signal Control Systems

The projects in this program area are geographically quite dispersed and there are few critical interdependencies, with the exception of the Interagency Coordination/Cooperation Committee, which will play a role in most projects and should be initiated immediately. The timing plan updates and microprocessor controller conversion projects should, of course, be coordinated with any other projects affecting the same traffic signals, such as the coordinated traffic signal system improvements and freeway traffic diversion timing plans.

Public Transit Systems

There are a number of critical interdependencies among projects and phases in this program area. With a few exceptions (discussed below), the numbering of projects and phases in this program arca reflects the recommended sequence of deployment and these key project interdependencies. The first projects in this program area will deploy automatic vehicle location (AVL) capabilities. This technology in turn provides the foundation for the remaining projects (with the exception of projects 3.5 and 3.6), which rely upon real-time vehicle location information. For example, deployment of real-time electronic station displays cannot occur until the automatic vehicle location projects are operational.

Although most projects in this program area depend upon and extend the AVL system, there are two projects which need not be coordinated with the AVL deployment. Projects 3.5 (Transit Traffic Signal Priority Systems) and 3.6 (Coordination with Traffic Management and Traveler Information Systems), are not dependent on other transit projects and can be implemented independently. However, it should be pointed out that once available, real-time vehicle location and related information will be some of the key data to be provided by the transit operators to regional traffic and information systems as part of Project 3.6.

Multi-Modal Traveler Information Systems

All of the individual traveler information dissemination project phases in this program area (e.g., kiosks, pagers, etc.) rely upon the previous development of the basic information data processing and distribution system, the central data server (project 4.1). Although the central data server will evolve over time as more dissemination tools are deployed, the basic functions of the server should be established before implementing any specific dissemination tools. Among the various project phases which implement specific dissemination tools, there are no critical interdependencies, although most of these tools will distribute similar information and deployment of subsequent devices will utilize the raw data used for previous devices.

Public-Private Partnerships

The "projects" in this program area for the most part focus on institutional arrangements with the private sector as they pertain to other specific projects identified elsewhere in the recommended plan. As such, they are closely related and all efforts to involve the private sector in the deployment of the overall Miami Valley ITS and its individual components should begin immediately and well ‘prior to the design of any particular project.

Technical and Planning Support

The "projects" in this program area consist of on-going activities which should begin immediately and continue throughout the process to deploy the recommended ITS. These activities, which pertain to the further planning and management of the Miami Valley ITS deployment, must, in many cases, necessarily occur prior to deployment of any specific project and will be closely coordinated with specific projects.

Major Linkages Across Program Areas

The most important linkage across program areas is between the various traveler information devices deployed in Program Area 3 and the freeway surveillance and detection capabilities deployed in Program Area 1. Although it is recommended that several information devices be deployed utilizing initially static information and non-freeway real-time information prior to completion of freeway detection systems, the traffic flow information made available through the detection system will constitute one of the most important information resources in the regional traveler information system. It should be understood that this information is the most critical roadway information to be

provided by the traveler information system and its incorporation into the system should be expedited.

7.6.2 Coordination with Other Construction

This section discusses issues that should be considered relative to the programming of ITS investments in relation to non-ITS projects.

Intelligent transportation system investments typically consist of additions or enhancements to existing facilities or services, e.g., adding detection/surveillance capabilities to an existing section of freeway. As such, there are often important opportunities for implementing ITS components as a part of other funded projects. Programming of ITS projects should include careful consideration of these opportunities and ITS programming should be closely coordinated with the programming of other "'traditional" transportation projects in order to capture these opportunities.

Major freeway construction projects, such as lane additions, provide a number of opportunities to implement portions of the communications and sensing infrastructure required for freeway management, including cable, pull boxes and in-pavement vehicle detection (e.g., inductive loops). Combining the installation of these components with other planned construction can significantly reduce the costs to the ITS program. This approach also provides a means of phasing ITS expenditures over time. Selected ITS infrastructure, such as cable and pull boxes, can be installed as far ahead as several years before the ITS field devices which utilize the infrastructure such as changeable message signs, are installed. This approach to installing the "street infrastructure" associated with freeway management has been used extensively and successfully by the a number of agencies throughout the country, including the City of Columbus.

Construction projects also provide an opportunity to purchase ITS equipment that can be employed elsewhere once the construction is finished, or which can remain in place and provide a lasting legacy. For example, purchase of a portable work zone traffic management system (portable vehicle detection, portable changeable message signs, etc.) can sometimes be funded under a major construction project, used on-site for the duration of the project and then redeployed elsewhere. Or, ramp meters could be funded and installed to help regulate traffic through a major freeway work zone and left in place and operational after the project is concluded. The Indiana Department of Transportation has been very successful in stretching ITS dollars by capitalizing on opportunities like these to make ITS investments which have a real benefit during construction but which also provide a lasting resource.

Taking the fullest advantage of construction related opportunities to make ITS investment relies upon the awareness and creativity of those who plan and program transportation improvements in the Miami Valley. Once a commitment to the regional ITS deployment strategy is made by all of the affected agencies, the question should be asked of each and every significant transportation investment: how can the ITS system be advanced through this project? The answers to that question may help fund ITS investments, insure the compatibility of infrastructure with subsequent ITS components or simply promote awareness of the ITS program. For all of these reasons, a proactive approach to seeking out ITS investment opportunities in conjunction with other projects is critical.

As a step in that direction, the current MVRPC and CCSTCC Transportation Improvement Programs were reviewed to assess potential opportunities to combine recommended early freeway/incident management projects with committed improvements. Funded freeway construction projects with budgets over $1 million that are located within the area identified for immediate and short term freeway management system deployment (I-75 from I-675 to I-70 and I-70 from US 48 to SR 201) were identified. These projects are shown in Figure 7-2. These projects represent excellent potential opportunities for coordinated ITS investment and should be examined in greater detail to identify the specific measures which can be taken.

Design and Procurement for ITS Compatibility

Non-ITS projects do not always provide opportunities to incorporate ITS investments. However, designing and procuring "traditional" transportation improvements in a way which will allow, or at least not exclude, future ITS enhancements, is an important strategy. Closely related to the issue of system architecture "openness", design and procurement of communications (e.g., radio, etc.) and control system components (e.g., traffic signal controllers) that can be integrated with ITS elements represents a sound strategy for ITS programming. In the case of facilities, new sign trusses can be sized so as to support future ITS components such as changeable message signs and on-ramps can be designed to accommodate ramp metering, which typically would include room for a high occupancy vehicle-only bypass lane and two lanes for single occupant vehicles.

7.6.3 Operations and Maintenance Cost Considerations

As with any other transportation investment decision, the decision to implement ITS projects should be made based on an understanding of, and a commit and plan to fund, the annual operating and maintenance costs associated with the project. Like the air traffic controllers at an airport, the human operators of freeway management and other ITS subsystems comprise a critical component of the overall system. Failure to adequately staff and fund ITS improvements on an on-going basis will cripple the effectiveness of the system and significantly devalue the resources expended to construct the system. The staffing and other components of project operations and maintenance costs of the projects recommended in this Miami Valley ITS Strategic Deployment Plan have been clearly identified in Tables 7.4,7.5 and 7.5.1.

One reason why ITS 0 & M *costs can* create controversy has *to* do *with* the *visibility* of ITS operations and staffing costs. Intelligent Transportation Systems often represent entirely new programs for implementors and the "new" costs to staff the system are obvious. On the other hand, the incremental 0 & M cost associated with new roadway construction, which would include incremental increases in the size of maintenance crews for example, are often "hidden" since they represent a very small (on a percentage basis) expansion of programs that have been in operation for many years and which are widely understood to be an unavoidable cost of providing transportation infrastructure.

The concept of "managing" the daily operations of the transportation system using staffed high-technology control centers (such as ITS-enhanced transit dispatch rooms or traffic signal control centers) is central to ITS and an approach that is perfectly appropriate given the constraints to

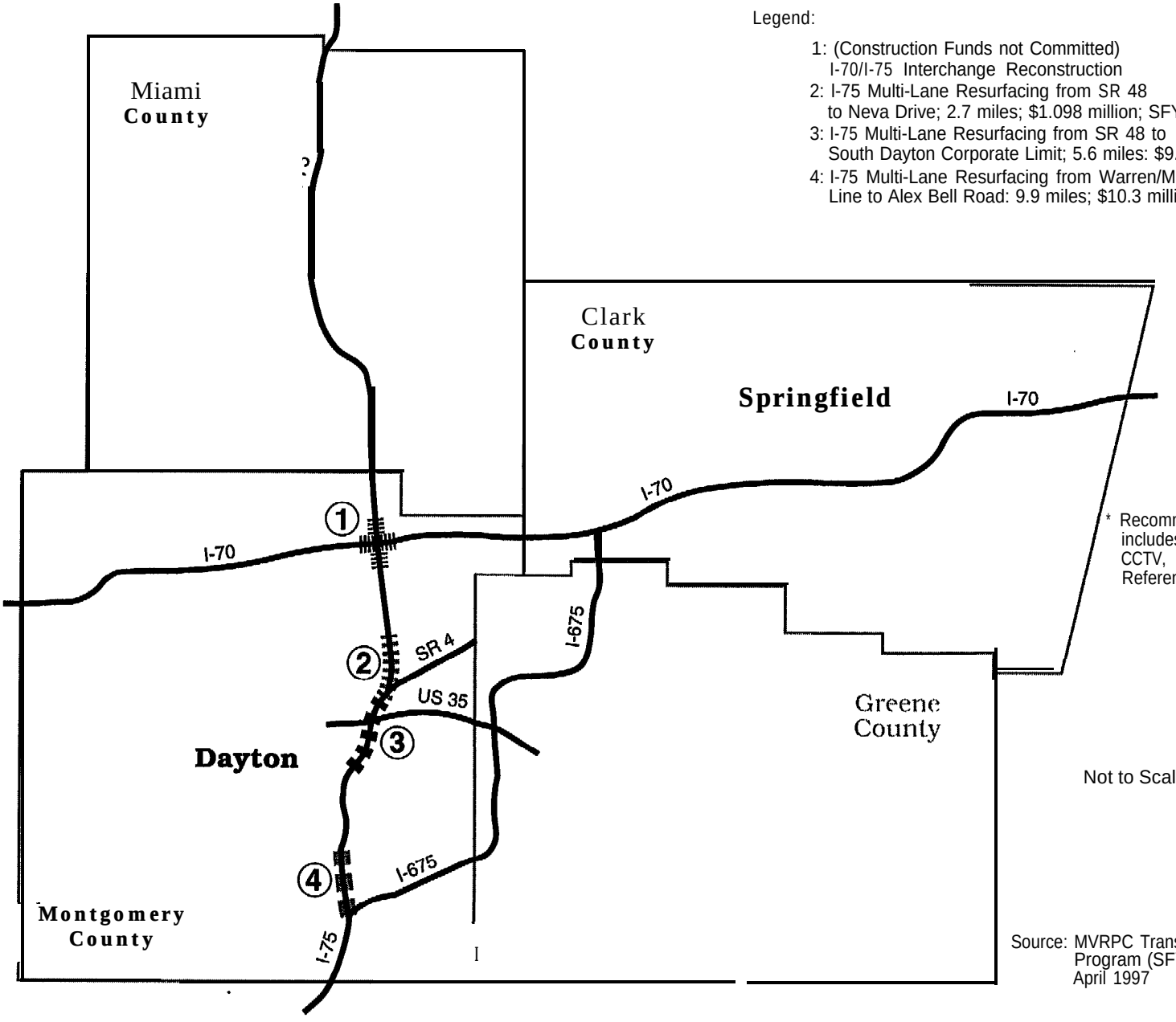


Figure 7-2

*Major (> $1 Million. Committed Freeway Construction Projects (SFY 19982001) Located within Recommended ITS Capital Project Areas**

capacity expansion which exist in most areas. Although the staff and other operations costs associated with ITS approaches are "new", highly visible and therefore represent a potential hurdle to deployment, the role of a freeway manager should be seen as just as necessary as that of an air traffic controller and ITS O & M funding should be seen as just as necessary a component of ITS deployment.

7.7 CONTRACTING AND PROCUREMENT ALTERNATIVES

The traditional procurement and contract procedures used by public agencies within the Miami Valley vary and may not always be well suited to the unique characteristics of ITS projects. ITS projects generally require extensive interagency cooperation, private sector personnel may need to be hired to staff public facilities, public-private partnership agreements need to be determined and privacy issues need to be resolved. ITS projects also involve the acquisition and placement of high-tech equipment which may require special procurement treatment. Therefore certain aspects of traditional procurement and contract procedures of the public agencies may have to be changed to accommodate ITS projects.

Many ITS projects will have their own unique characteristics that will need to be addressed. This section identifies some of the options and issues relative to procurement and contracting procedures of typical ITS projects and services.

7.7.1 Procurement Options

Five (5) basic procurement options have been identified.

- Engineer/Contractor
- Systems Manager
- Sole Source
- Design/Build (operate)
- Public/Private

The first two methods are fairly common and will be familiar to most public agencies in the Miami Valley. The latter three (3) methods may require education of agencies for utilization of these techniques for implementing ITS projects.

Engineer (Consultant)/Contractor Approach

The Engineer (Consultant)/Contractor method represents the traditional procedure used by public agencies. Based on project requirements and preliminary studies, the engineer (consultant) prepares the final study and/or design plans, specifications and estimates (PS&E) for the proposed project. An agency employee or a consultant can act as the engineer. The completed PS&E is then presented to the contractor community and receives bids in accordance with established procedures.

The contractor bids on the PS&E and agrees to provide a complete system consisting of hardware and software which will be procured, installed and implemented by the contractor. Hardware may

be manufactured by the contractor's organization and/or subcontracted within the conditions imposed by the contract. The contractor may also be responsible for system startup assistance. In the case of traffic control systems, the calibration of the system and the development and implementation of timing plans and other database elements may be required.

The engineer (consultant) is responsible for inspecting and acceptance of project components and the entire system.

Systems Manager

The Systems Manager option requires the pubic agency to select a single firm or consulting team as systems manager. The systems manager is responsible for system design, PS&E preparation, systems integration, documentation and training.

The project is divided into several sub-projects and each sub-project is contracted by using the agency's normal bidding processes. The systems manager oversees all work by the various contractors. The sub-project contractors can be selected on the basis of specific sets of skills required for each sub-project. This permits the selection of experts for various steps of the system. The systems manager is responsible for integrating the sub-projects into an overall operating system.

The contract between an agency and the systems manager is typically a negotiated contract which allows contract flexibility when projects are refined. This procurement method assigns responsibility of total system success to one entity and creates an environment to more easily meet project requirements.

Sole Source Approach

This form of procurement is used when there is documented existence of one (1) technical or cost effective solution to the requirements of a certain project. Sole Source procurement is most often used when compatibility with existing equipment and/or systems is required.

In the early stages of establishing components of an ITS system, sole source procurement should not be necessary. During the later stages of development, sole source procurement may need to be employed to ensure system-wide compatibility.

Design/Build (Operate) Approach

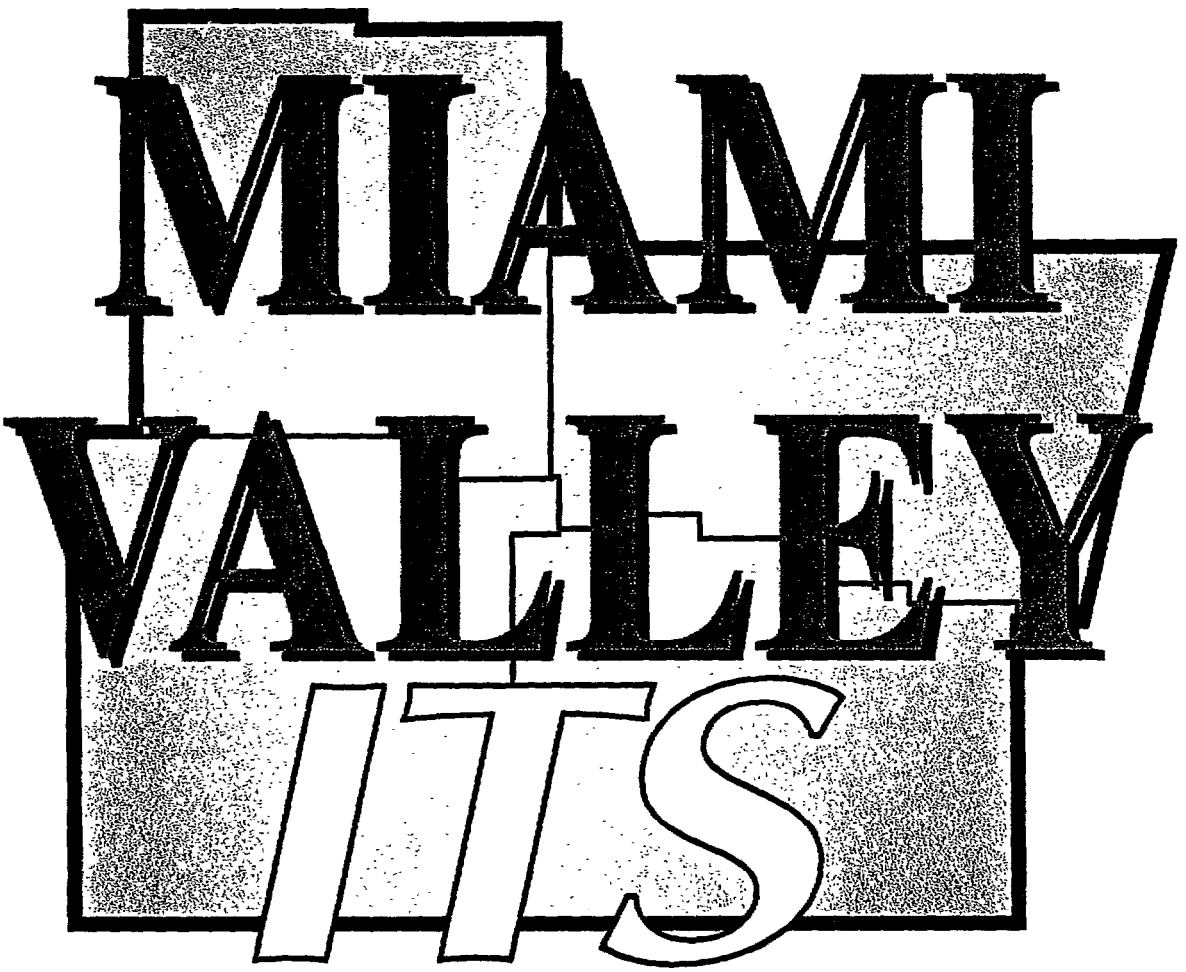
The design/build approach requires the selection of a single responsible entity to perform all work associated with the deployment of the system and its components. The selected entity may also be responsible for ongoing operation of the system. The public agencies is responsible for monitoring the activity of the design/builder. The design/builder performs all design work, contracts and/or constructs the system elements and systems and turns over the operating system to the public agency. In some instances the design/builder will operate the system with oversight and monitoring maintained by the public agency.

A limitation of this approach is that the public agency loses some control over the design of the project. The agency's sole role is reduced to oversight and monitoring of the design/builder and does not involve any of the design details that may impact the operational needs of the agency.

Public-Private Approach

This relatively new procurement approach establishes a public-private partnership for financing and implementation of a project. Program Area 5 in Section 6.0 of this report identifies a number of different specific partnership opportunities that should be considered as deployment of the Miami Valley ITS proceeds.

The Federal ITS program has encouraged the utilization of public-private partnerships for ITS and a wide range of approaches have been tried. The private sector has been identified as a source of capital, expertise with new technologies and progressive management and deployment practices. Partnerships with private organizations allow the public sector to gain experience, defray deployment costs, exercise more options and accelerate deployment. Potential benefits to the private sector include gaining access to a long-term market, creating a supporting infrastructure for their products, and having the opportunity to showcase and refine their products and technologies.



B/C ANALYSIS